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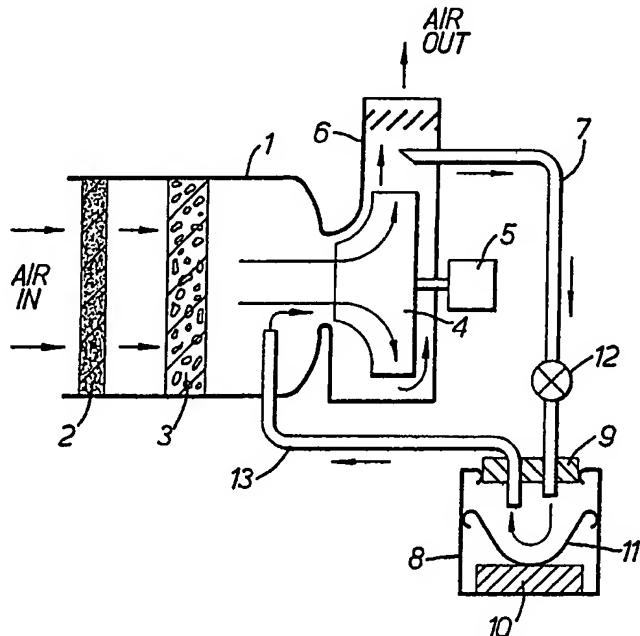
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## (54) Air purification systems

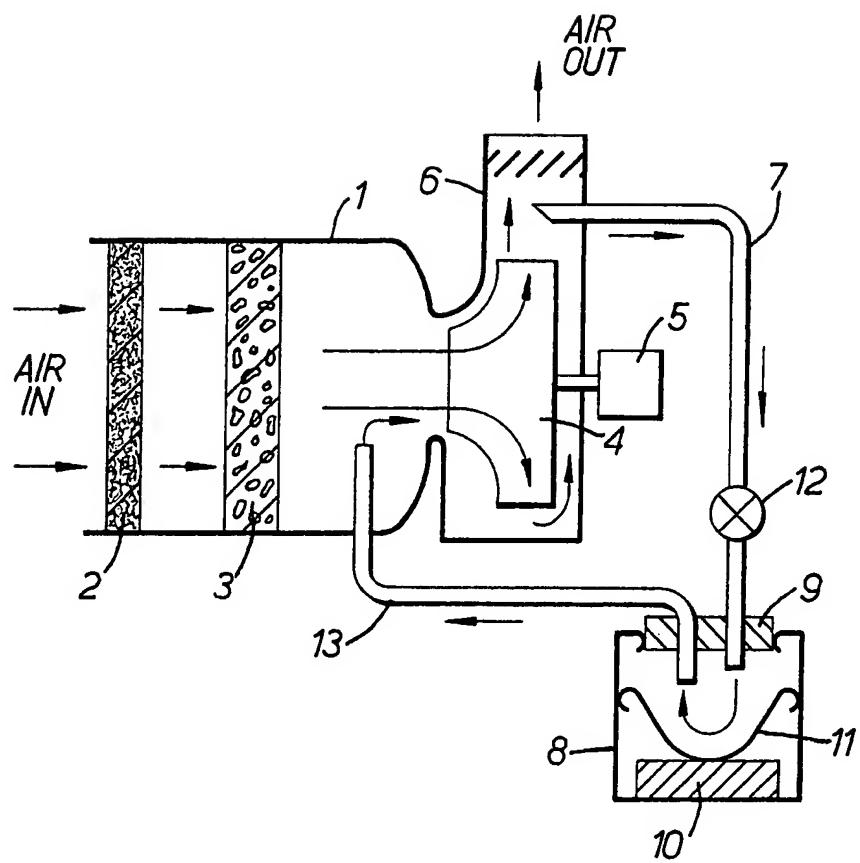
(57) Air is drawn through a dust and deodorizing filter (2,3) by an impeller (4) and perfume is added to the air flow from a reservoir (8) which is so connected in the system that the air flow through the reservoir is a small proportion only of the air flow through the system. Preferably, the rate of air flow through the reservoir (8) can be controlled, for example by a valve (12). The system may be used in a cooker hood or portable, room air purifier.



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**SPECIFICATION****Air purification systems and apparatus**

5 This invention relates to air purification systems and apparatus and has particular but not exclusive reference to such systems and apparatus for domestic and commercial use.

Examples of such systems and apparatus in 10 domestic use are the well-known cooker hood in which cooking fumes are drawn over a composite filter usually comprising a mesh and a filter bed of activated carbon granules, and the portable purifier for rooms in which air is circulated through a filter 15 which removes dust and other small particles and may incorporate a filter of activated carbon which provides a degree of deodorizing of the air.

Many forms of commercial air purification systems operate on a similar basis, air being drawn 20 through a filter manually including a dust filter and sometimes a carbon granule filter.

It has been proposed to incorporate in such 25 systems an arrangement for adding to the air flow a small quantity of a suitable perfume in order to mask any unpleasant residual odours that the filter has not removed. The addition of such perfume creates a sense of freshness in the air leaving the filter but if overdone the effect is unattractive because of a heavy smell of perfume. In many cases, the perfume 30 is held on a pad or pads situated in the air stream. The release of perfume from a pad is uncontrolled with the result that when the pad is new the rate of release is too high and there is a heavy smell of perfume in the air. The rate of release quickly drops 35 and then there is insufficient perfume released to be effective.

It is an object of the present invention to provide 40 an air purification system and apparatus that includes an arrangement for releasing a perfume in a controlled, regulatable manner.

According to the present invention, an air purification system incorporates a reservoir for containing a perfume, the reservoir having an air inlet through which atmospheric air enters the vessel and an 45 outlet through which perfumed air leaves the vessel to enter the system, the arrangement being such that the air flow through the vessel is a small proportion only of the air flow through the system.

Preferably, the air inlet is connected to the system 50 downstream of air filters therein so that purified air enters the vessel.

In one embodiment of the invention, the air inlet is joined to the system on the high pressure side of an impeller used to draw air over the air filters of the 55 system, the air outlet being joined to the system upstream of the impeller on the low pressure side thereof.

In such a system, an air flow control valve may be included in the connection from the high pressure 60 side to the air inlet or in the connection from the vessel to the low pressure side or both.

In another embodiment, the outlet is in the form of an injector and is located downstream of the impeller used to draw air over the air filters of the system.

65 In the embodiment just mentioned, the inlet may

be a controllable aperture to vary the rate of flow of air through the vessel, or alternatively, an air flow control valve may be included to control the rate of flow of air through the vessel.

70 In yet another embodiment, the vessel may have an air inlet opening directly to atmosphere and an outlet joined to the system upstream of the impeller. In this case, the air inlet may be a controllable aperture or it may incorporate an air flow control valve.

The vessel may be a compartment inside the system or a separate vessel housed in the system.

By way of example only, a system and apparatus embodying the invention will now be described in 80 greater detail with reference to the accompanying drawing which shows the apparatus in schematic form only.

The apparatus incorporates a filter assembly located in a housing 1 and including a dust filter 2 and 85 a filter 3 containing activated carbon which provides a degree of deodorizing of air drawn through the housing 1 by an impeller 4 driven by an electric motor 5.

The output of the impeller 4 is conveyed to an 90 outlet by a duct 6. A bleed tube 7 extends for a short distance into the duct 6 at a location adjacent the impeller output. The tube 7 connects with the interior of a vessel 8 with transparent walls and containing a quantity of perfume either as a liquid or 95 as a porous pad saturated with perfume. The vessel is sealed by a closure 9. The drawing shows a pad 10 held in position by a retainer 11 which may be a spring clip of wire or other resilient material. In the tube 7 is an adjustable flow control valve 12.

100 Extending for a short distance into the housing 1 adjacent the input of the impeller 4 is another tube 13 whose other end is located within the vessel 8 as shown.

105 Preferably, the end of the bleed tube 7 that is located in the duct 6 is bevelled and faces into the flow of air leaving the impeller 4. The end of tube 13 that is inside the housing 1 is flat as shown.

With the motor 5 energised and rotating the impeller, a very small proportion of the cleansed air 110 flow leaving the impeller 4 and thus on the high pressure side thereof is ducted by the bleed tube 7 into the vessel 8 where it picks up perfume vapour given off by the pad 10 and conveys it to the impeller input via the tube 13.

115 The bore of the tubes 7 and 13 and the setting of valve 12 determine the concentration of perfume in air leaving duct 6. For example, for an impeller delivering up to 500 cubic feet of air per minute, tubes with a bore of about 0.125 - 0.25 inches have 120 been found to be satisfactory with the valve 12 at mid-setting between fully open and fully shut.

Perfume is thus released in a controlled and 125 regulatable manner. The valve 12 enables a user to vary the release somewhat according to requirements.

Replenishment of the supply of perfume in the vessel 8 involves merely disconnecting the tubes 7 and 13, for example by removing the closure 9 after which more perfume is poured in or the pad 10 replaced.

The vessel 8 may be located inside the apparatus or it may be an external component. Where the apparatus is a portable room air purifier, it is preferable that perfume pads are used as these

5 avoid accidental spillage of liquid from the vessel.

In another embodiment of the invention, that end of the tube 7 inside the duct 6 points downstream and acts as injector drawing perfumed air from the vessel 8. In this case, the vessel 8 may have a

10 controllable air inlet aperture through which air passes into the vessel directly from atmosphere. The valve 12 and the tube 13 are then not required. Alternatively, the inlet may have a fixed aperture, the rate of flow of perfumed air being controlled by

15 valve 12.

In these embodiments, air entering the vessel has not passed through the filters 2 and 3 but as the volume of air is small compared with the flow through those filters, any entrained dust or odours

20 present on the air passing through the vessel is not noticeable.

It is, of course, possible to employ only tube 13 in conjunction with a vessel having a controllable air inlet. This arrangement is not as satisfactory as the

25 previously-described embodiments, the flow of air into the vessel has not passed through the filter 2, 3.

The vessel 8 may be a compartment inside the housing 1 at the duct 6, the compartment having an inlet through which air enters the compartment from

30 atmosphere and an outlet through which perfumed air joins the air flow through the purifier. The sizes of the inlet and outlet are dimensioned to provide a predetermined flow of air through the compartment and hence release of perfume at a controlled rate. As

35 has been explained above, air entering such compartment has not passed through the filters.

#### CLAIMS

40 1. An air purification system incorporating a reservoir for containing a perfume, the reservoir having an air inlet and an outlet which provides entry for perfumed air to the system, the arrangement being such that, in use, air flow through the

45 reservoir is a small proportion only of the air flow through the system.

2. A system as claimed in claim 1, in which the reservoir air inlet is connected to receive air from the system downstream of an air filter therein.

50 3. A system as claimed in claim 2, which includes an impeller operable to draw air over the filter, and in which the reservoir air inlet is connected to receive air from the system on the downstream side of the impeller.

55 4. A system as claimed in claim 3, in which the reservoir outlet is connected to the system on the upstream side of the impeller.

5. A system as claimed in claim 1, in which the reservoir air inlet opens directly to atmosphere.

60 6. A system as claimed in claim 1 or claim 5, which includes an air filter and an impeller operable to draw air over the filter, and in which the reservoir outlet is located downstream of the impeller.

7. A system as claimed in claim 1 or claim 5,

65 which includes an air filter and an impeller operable

to draw air over the filter, and in which the reservoir outlet is connected to the system on the upstream side of the impeller.

8. A system as claimed in any one of the

70 preceding claims, including an air flow control valve arranged to control the rate of air flow through the reservoir.

9. A system as claimed in claim 5, in which the reservoir air inlet is a controllable aperture adjust-

75 able to vary the rate of air flow through the reservoir.

10. A system as claimed in any one of the preceding claims, in which the reservoir is located externally of the system.

11. A system as claimed in any one of claims 1 to

80 9, in which the reservoir is a compartment or housing within the system.

12. An air purification system substantially as described herein with reference to, and as illustrated by the accompanying drawing.

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